

SHAPING UP

What's a polygon with 5 sides? What's a quadrilateral with sides of equal length? What's a quadrilateral with opposite sides that are parallel and of equal length?

Simplify each problem. Write the exercise number in front of the corresponding answer listed in the grid. To spell out the answers at the bottom of the page, refer to the grid and write the code letter that corresponds to the exercise number given.



Tip: Rearrange the variables at the final stages of simplification (no parenthesis) so that like-variables are next to each other. For example, $x^2y^4x^3yz \rightarrow x^2x^3y^4yz \rightarrow x^5y^5z$. Note that exponents of different variables cannot be added together.

1. $(x^2 \cdot x^3)^3$

10. $(-4x^2)^3$

2. $(2x)^2$

11. $(-x^3)(4x^3)^2$

3. $(-8x^3)^2 \cdot x^3$

12. $(-5xy)^2(x^2y^2)$

4. $(-xy)^2(x^2y^4)$

13. $(2x^4)^3$

5. $(2x)^3 \cdot (2x^3)^3$

14. $(-3xy^3)^2(-2x)^3$

6. $(-2x)(3xy)(4y)$

15. $(5x)^2 \cdot x^3$

7. $(3x)(3x^2)$

16. $(3x^2yz^2)^3(xyz)$

8. $(x^2y)(2xy^2)(4xy)$

17. $(-x^4)(9x^3)^2$

9. $(xy^2)(x^2y)^2$

18. $(-x^3yz)^4(-3z^5)^3$

Code Letter	Exercise #	Answer
A		$-64x^6$
B		$-27x^{12}y^4z^{19}$
C		$64x^9$
D		x^5y^4
E		$-72x^5y^6$
G		$64x^{12}$
H		$-16x^9$
I		$-24x^2y^2$
L		x^{15}
M		$27x^7y^4z^7$
N		x^4y^6
O		$8x^4y^4$
P		$8x^{12}$
Q		$-81x^{10}$
R		$4x^2$
S		$9x^3$
T		$25x^4y^4$
U		$25x^5$

Answer:

13 14 4 12 10 5 8 4 2 11 8 16 18 15 7

13 10 2 10 1 1 14 1 8 5 2 10 16

ANCIENT CALCULATOR

Long before calculators were invented, this mathematical tool was used to quickly add numbers. A skilled individual can use this device to add up to fifteen numbers in one minute. What is the tool called?

Simplify the exponential terms. Match your answers to those given. Write in front of each exercise number the letter representing the solution. Use the letters from the odd-numbered problems to spell out the answer to the question.



Tip: Remember that $a^{-n} = 1/a^n$ and $1/a^{-n} = a^n$ and $a^0 = 1$ (when $a \neq 0$). Keep in mind that a number in front of a variable with a negative exponent is not inverted.

For example, $5x^{-8}y^{-3} = 5/(x^8y^3)$.

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|-------------------------------|-----------------|
| _____ 1. x^{-5} | (U) y^2 |
| _____ 2. $x^{-3}y^4$ | (B) y^3/x^6 |
| _____ 3. x^{-6}/y^{-3} | (C) 1 |
| _____ 4. $1/(x^{-2}y^{-3})$ | (N) $-4/y^5$ |
| _____ 5. $x^{-1}y$ | (U) x^2y^3 |
| _____ 6. $(-4x)^0y^{-3}$ | (A) $1/x^5$ |
| _____ 7. x^0y^0 | (K) $1/(25x^2)$ |
| _____ 8. $(4x)^{-1}(3y^{-2})$ | (T) $1/y^3$ |
| _____ 9. $1/(x^0y^{-2})$ | (P) y^4/x^3 |
| _____ 10. $(-5x)^{-2}$ | (A) y/x |
| _____ 11. $3/(x^{-4}y^3)$ | (S) $3x^4/y^3$ |
| _____ 12. $(-4x^0)(y^{-5})$ | (C) $3/(4xy^2)$ |

Answer: _____